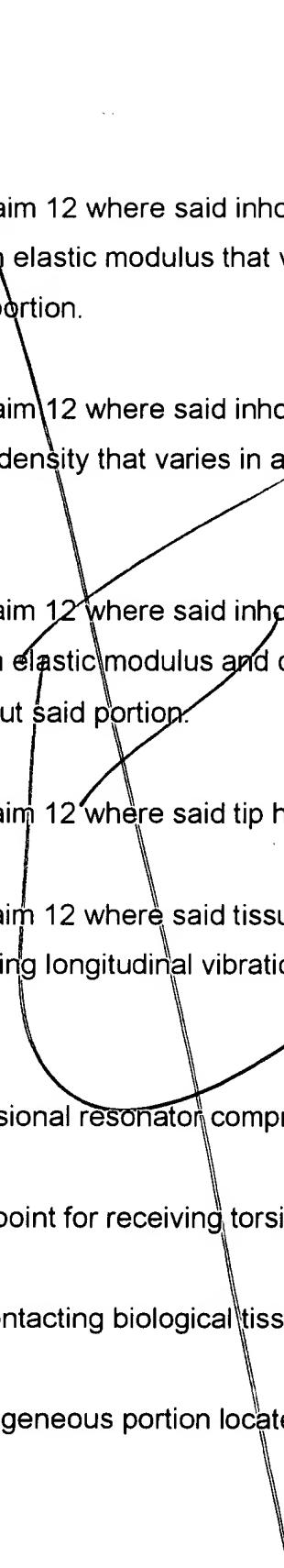


14. A resonator of claim 12 where said inhomogeneous portion comprises a section having an elastic modulus that varies in a helical manner throughout said portion.
15. A resonator of claim 12 where said inhomogeneous portion comprises a section having a density that varies in a helical manner throughout said portion.
16. A resonator of claim 12 where said inhomogeneous portion comprises a section having an elastic modulus and density that vary in a helical manner throughout said portion.
18. A resonator of claim 12 where said tip has a cutting edge.
19. A resonator of claim 12 where said tissue contacting tip and said point of contact for receiving longitudinal vibration are joined by a hollow passageway.
20. A longitudinal-torsional resonator comprising
 - A contact point for receiving torsional vibration
 - A tip for contacting biological tissue
 - An inhomogeneous portion located between said contact point and said tip

21. A resonator of claim 20 where said inhomogeneous portion comprises a section having a rectangular cross section having the shape of a helical spiral.
22. A resonator of claim 20 where said inhomogeneous portion comprises a section having an elastic modulus that varies in a helical manner throughout said portion.
23. A resonator of claim 20 where said inhomogeneous portion comprises a section having a density that varies in a helical manner throughout said portion.
24. A resonator of claim 20 where said inhomogeneous portion comprises a section having an elastic modulus and density that vary in a helical manner throughout said portion.
25. A resonator of claim 20 where said tip has a cutting edge.
26. A resonator of claim 20 where said tissue contacting tip and said point of contact for receiving longitudinal vibration are joined by a hollow passageway.